U. S. Circuit Court. No. Dist. of Illinois
Northern Division

National Phonograph Co., Comp.) In
versus Lambert Co. & Tho.B. Lambert) Equity

Edison Phono. Co., Complainant vs.) In
Lambert Co. & Thomas B. Lambert) Equity

COMPLAINANTS' BRIEF

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United States Circuit Court,

Northern District of Illinois,

Northern Division.

NATIONAL PHONOGRAPH COMPANY, *Complainant,* *vs.* LAMBERT COMPANY and THOMAS B. LAMBERT, *Defendants.*	IN EQUITY.
EDISON PHONOGRAPH COMPANY, *Complainant,* *vs.* LAMBERT COMPANY and THOMAS B. LAMBERT, *Defendants.*	IN EQUITY.

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RICHARD N. DYER,
Of Counsel for Complainants.

ISHAM, LINCOLN & BEALE,
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NATIONAL PHONOGRAPH COMPANY, *Complainant,* *vs.* LAMBERT COMPANY and THOMAS B. LAMBERT, *Defendants.*	IN EQUITY. 25789
EDISON PHONOGRAPH COMPANY, *Complainant,* *vs.* LAMBERT COMPANY and THOMAS B. LAMBERT, *Defendants.*	IN EQUITY. 25788

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COMPLAINANTS' BRIEF.

These are suits for infringement of certain patents relating to phonograph records invented by Thomas A. Edison. By stipulation (C. R., p. 18, fol. 69; D. R., p. 26) testimony has been taken by each party jointly and simultaneously in both cases. The interest of complainants is the same in both cases, and since the infringement complained of consists in the unlawful manufacture, use and sale of a single structure, the

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two cases may be regarded practically as a single suit based on three patents, and we shall so consider them in our discussion of the questions here involved.

Each of the bills of complaint contains the usual prayer for an injunction and accounting, and each of the answers sets up the customary defenses of lack of novelty and invention, and non-infringement.

The evidence for complainants in support of the patents consists in each case of a short deposition of Mr. Edison on the question of the commercial utility of the patented devices, and two depositions of a patent expert, Mr. Dyer, the first, on the *prima facie*, case explaining the patents in suit and their bearing in the art as well as their relation to defendants' manufacture, and the second, on rebuttal, reviewing the deposition of defendants' expert and considering in detail the several defenses as well as the alleged anticipating patents and practices. The evidence introduced by defendants in each case comprises a short deposition from the president of the defendant company, Mr. Philpot, describing defendants' process, as well as a deposition of a patent expert, Mr. Carter, who discusses the several defenses from defendants' point of view. The case is therefore practically confined to a discussion of the questions at issue, pro and con, by the two experts, and the Court is called upon to decide which of these conflicting views more correctly recites the true relation of the patents in suit in their bearing on the art. It is because of this anomalous situation that we have found it necessary, in the discussion of the case which follows, to quote, not only frequently, but ofttimes at length, from the depositions of the two experts.

The Phonograph and its Development Prior to the Patents in Suit.

The original phonograph, as is well known, was invented by Mr. Edison about 1877, and consisted of a cylindrical mandrel having a spiral thread cut in its periphery and covered with a sheet of tinfoil. A

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pointed stylus engaged the foil and was carried by a vibrating diaphragm. The cylindrical mandrel was so mounted that when rotated it was moved laterally to always maintain the spiral thread in alignment with the pointed stylus. By now impressing the diaphragm with articulate or other sounds the diaphragm would be vibrated, causing the stylus to form a series of indentations in the tinfoil. Upon again engaging the stylus with the forward end of the record so produced, and by rotating the mandrel, the indentations in the tinfoil would cause the diaphragm to partake of a reproduction of its original vibrations, so as to reproduce the original sounds. A modification of the original Edison phonograph is disclosed in Edison's patent No. 200,521 of February 19th, 1878 (D. R., p. 170). The original phonograph, although a very wonderful philosophical apparatus, was not suited for practical use, since the sounds obtained were distorted and the tinfoil surface became quickly destroyed. Furthermore, the tinfoil record of the original phonograph, owing to its fragile nature and to the fact that when applied in place a joint was formed between the meeting edges, could not be removed and again replaced in position on the same or some other instrument. Consequently, with the original phonograph, the practice was to apply the foil in place, make a record therein, reproduce it a few times and tear the foil off, in doing which, of course, the record would be destroyed.

About 1881 the practical development of the phonograph was undertaken by Bell and Tainter, who constructed an apparatus in which the recording surface was of the form of a disk of wax, in which the stylus produced the record by a cutting or engraving operation as distinguished from mere indentations. This machine, for commercial purposes, was called the "graphophone," and it is shown in the Bell and Tainter patent No. 341,214 of May 4th, 1886 (D. R., p. 194). This patent was sustained by Judge GROSSCUP (American Graphophone Co. vs. Amet, 74 Fed. Rep., 789) and by Judge SHIPMAN (American Grapho-

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phone Co. vs. Leeds *et al.*, 87 Fed. Rep., 873) in the Southern District of New York.

Bell and Tainter's graphophone, in its original as well as in its perfected forms, introduced into the art the realization of a removable self-supporting record without joints in the record surface, thus making it possible to remove the record from the machine at will and to employ it for securing reproductions at any time in the same or in any other machine. This idea is utilized in all known forms of talking machines at the present time.

The disk graphophone was not a commercial article, and its inventor therefore produced an improved device in which a cylindrical record was used, carried on a cylindrical mandrel (see Tainter patent No. 341,288 of May 4th, 1886, D. R., p. 204). Obviously the mounting of a cylindrical record on a cylindrical mandrel would be attended by many objections, since there must be absolute accuracy in fit to permit the record to be rotated, and any unequal expansion or contraction or warping, either of the mandrel or the record, would prevent the accomplishment of successful results.

The next step in the development of the graphophone is disclosed in the Tainter patent No. 375,579 of December 27th, 1887 (D. R., p. 228), in which the cylindrical mandrel is formed at one end with a small shoulder (40), against which the record could be engaged to rotate by friction. The objections to such a construction are pointed out by complainants' expert, Mr. Dyer (C. R., p. 44, fols. 173, 174), who said :

> " In this way, by making the mandrel small enough, there would be no trouble in always slipping the record easily over the same, but the suggestion of rotating the record by engaging one of its ends with a shoulder, presented new and equally serious difficulties. In the first place, if a record were engaged in this way with an inclined shoulder, the friction between the two would be very slight unless the record were jammed very tightly in place, so as to distort it at one end and probably crack the delicate record

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surface. In the next place, the other end of the record would be unsupported, and under the pressure of the recording and reproducing devices would wobble, so as to turn eccentrically with respect to the mandrel. And finally, this wobbling of the record on the mandrel would, in two or three rotations, work it loose so that it would no longer turn."

These objections were evidently appreciated by the inventors of the graphophone, because in their final apparatus the mandrel was entirely dispensed with, and the attempt was made to support the cylindrical record from its ends only. This construction is shown in the Tainter patent No. 380,535, of April 3d, 1888 (application filed December 2d, 1887), in which the supporting disks are represented by the letters H and H^1, the latter being spring-pressed to engage the record elastically (C. R., p. 106).

The patent last referred to, then, represents the complete development of the phonograph or graphophone up to the year 1887 and illustrates the construction of device which was actually used by the graphophone company at that time (C. R., p. 45, fol. 177). The arrangement was crude and ineffective, and, as we shall show, was immediately supplanted by the perfected phonograph as developed by Mr. Edison, utilizing, among others, the inventions of the patents in suit.

The Patents in Suit and What They Accomplished.

At least as early as 1887 Mr. Edison again turned his attention to the phonograph, having before him the work of Bell and Tainter, who had previously suggested the making of the record by a cutting or engraving process. Mr. Edison says :

> " Previous to 1889 a large number of attempts had been made to devise a phonograph which could be handled by inexperienced persons, so that a machine shipped to any part of the world could be worked by any person without the neces-

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sity of having an expert to show them how to manipulate it, but just from simple printed instructions. In 1889, by a number of small inventions, this object was accomplished, and from that time the phonograph in the hands of the public worked successfully and was commercial. One of the earlier forms of phonographs was put out by the Graphophone Company, but on account of the complication of the devices used it was found not to be commercial, and all the machines put out were withdrawn from the market. The Graphophone Company then took a license under our patents, and have since put out the phonograph in the same form as is now universal, employing the inventions in this litigation. The devices which made the phonograph commercial when used by inexperts were very simple in character, but were enormously important in accomplishing the object. These inventions were the dispensing with the use of mechanism to hold the cylinder in position on the phonograph, and the substitution of the simple device of a tapering mandrel and tapering cylinder. Another invention which helped to make it practical was the use of a floating weight upon which the recorder and reproducing points were placed. It was found almost impossible to get the cylinders to run true, and therefore the floating weight with its recording point permitted the use of cylinders which were not accurately true when rotated. The third device which helped to make it commercial was the use of a cylindrical recording and reproducing point of hard material, like sapphire. It is almost wholly due to these three devices that the phonograph was made commercial" (C. R., pp. 83, 84, fols. 331–334).

With the second and third class of inventions to which Mr. Edison refers, the present cases have nothing to do, and the patents in suit relate entirely to those inventions which, in Mr. Edison's words, consisted in "dispensing with the use of mechanism to hold the cylinder in position on the phonograph."

I. The first patent in suit, No. 382,418, dated May 8th, 1888 (C. R., p. 91), states that its object

> "is to produce a cylindrical phonogram blank or phonogram which can be readily placed upon the phonogram cylinder of a phonograph, and will

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centre itself, and will also be adapted to retain its place upon the phonogram cylinder by friction alone. This I accomplished by providing the cylindrical phonogram blank or phonogram with a tapering bore adapted to fit over a similarly tapered phonogram cylinder. The phonogram blank or phonogram is provided with a cylindrical recording surface. Blanks or phonograms of the full length of the tapering phonogram cylinder of the phonograph can be used as well as those of shorter length, the tapering bore centering the blank or phonogram, and adapting it to be pushed onto the phonogram cylinder until it binds thereon with sufficient friction to hold it in place."

The specification states that the records or phonograms are "made of wax or a wax-like substance." The advantages of making a phonograph record with a tapered bore and rotating it by a frictional engagement with a tapered mandrel are explained by complainants' expert, who said:

"That invention made it possible to readily place the record or blank on the mandrel or phonogram cylinder of the phonograph, for the reason that all that it is necessary to do is to push the record or blank over the mandrel until the former binds on the latter and retains its place by friction. The invention effected the true centering of the record or blank with respect to the recording or reproducing devices, for the reason that when the record or blank is in engagement with the mandrel the two will be absolutely concentric, and since the relation between the mandrel of the phonograph and its recording and reproducing devices is fixed, the record or blank when in position on the mandrel will for all portions of its surface occupy the desired relation to those devices. Finally, the invention made it possible for the record or blank to retain its position on the mandrel or phonogram cylinder by friction alone, for the reason that the tapered bore permits the record or blank to be tightly engaged with the mandrel merely by forcing the former longitudinally until it binds in place. Thus by a very simple expedient very important practical advantages were secured, which have, so far as I know, been utilized in all modern talking machines employing cylindrical records. A fur-

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ther and very important advantage arising from the invention of the patent under consideration is that phonograph records or blanks of widely different lengths can be properly received and held upon the tapered mandrel, for the reason that the engagement between the record or blank and the mandrel is a radial and not a longitudinal engagement, as was the case, for example, with the earliest graphophones, wherein the records were supported between two end disks, one of which was spring-pressed " (C. R., p. 22, fols. 85–88).

II. The second patent in suit, No. 382,462, dated May 8th, 1888 (C. R., p. 95), relates also to phonograph records or phonograms. Prior to the date of that patent these devices were always composed of a suitable backing of tough material, like paper, covered with record was wax or waxlike material in which the a coating of formed. Thus, the Bell and Tainter patent No. 341,214 (D. R., p. 195, line 66) says :

> " This part of the invention also consists in a recording material composed of a wax or waxy surface on a paper or pasteboard foundation."

The Tainter patent 341,288 (D. R., p. 213, line 16) says :

> " It consists of a hollow cylinder or tube of paper, or other suitable material, coated with wax or waxlike composition, preferably a compound or mixture of beeswax and paraffine."

In Tainter patent No. 375,579 reference is made to

> " a tablet, consisting of a paper tube or cylinder provided with a coating of wax or waxlike composition " (D. R., p. 237, line 18).

Although the Tainter patent No. 380,535 (C. R., p. 109) does not specifically describe the record, the latter is clearly illustrated in the drawing (see figure 3) as being composed of a paper tube with a wax coating. Finally, the Edison patent in suit No. 382,418 describes and illustrates a record " made of wax or a waxlike substance which may be mounted upon a backing " (C. R., p. 9, line 37).

In patent No. 382,462, at present under considera-

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tion, Edison calls attention to the objections which he experienced with composite records formed with paper foundations and wax or wax-like coatings, due to the fact that the latter

> " contract and expand under variations of temperature to a much greater extent than paper, wood, metals, and other similar harder substances. While under ordinary conditions the wax or wax-like surface may not be injured by this difference in the coefficient of expansion, yet when subjected to extreme cold the contraction of the wax is so much greater than the harder backing that the wax will crack and destroy the continuity of the surface (line 12, *et seq.*).

The object of the invention is therefore stated to be:

> " to produce a phonogram blank or phonogram which will have the wax or wax-like surface, and will not be subject to the objection that has been stated. This I accomplish by constructing the phonogram blank or phonogram wholly of the wax or wax-like material " (line 33, *et seq.*).

These wax or wax-like records are described as being preferably molded, are formed with tapered bores, so as to be received on the mandrel, and are of sufficient thickness to retain their shape under the conditions of use. Simple as the change may now appear to be, the making of a phonographic record of the same wax-like material throughout marked a radical departure from the entire practice that preceded it, and resulted in the production of the article which is now universally used.

III. The third patent in suit, No. 414,761 of November 12th, 1889 (C. R., p. 99), also relates to phonographic records, and the invention consists in forming the bore with ribs, flanges or projections shaped to fit the mandrel. The specification says:

> " Heretofore these cylinders have been made with a smooth inner surface fitting closely upon the cylinder of the phonograph. I have found that several advantages arise from providing the

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> interior of the cylindrical phonogram blank with ribs, flanges, or projections, and it is in this that my invention mainly consists. This construction makes it easier to remove the molded blank from the mold in which it is formed, enables the injurious effects of contraction or warping of the cylinder to be readily removed, and prevents any bad effect from the accumulation of dust on the cylinder of the phonograph" (lines 14–29).

Although the patent states that the preferable construction consists in forming "a spiral rib on the interior surface of the blank" (lines 29, 30), since in this way the core around which the material is molded can be removed by a screwing operation, yet, as we shall show, the first and second claims are not limited to a rib of this form, and it is entirely clear, from the general reference to "ribs, flanges or projections," that the patentee did not regard his invention as being limited to such a construction. Moreover, neither complainants nor defendants employ spiral ribs, but in both cases a series of annular ribs are used. In the patent itself the advantages accruing from the invention are stated:

> "Where the blank is formed with an internal rib or ribs and such warping occurs, it is only necessary in order to remove it, to cut away the edges of the ribs, and thus a blank having a true inner surface can be formed with less labor and expense and waste of material than where the smooth surface is used. I make the ribs always deep enough to allow for the reaming out of the cylinder. Another advantage is that when the blank is placed on the phonogram cylinder any particles of dust or other foreign substance which may be on the cylinder enter and remain in the spaces between the ribs, instead of coming between the blank and the cylinder, where they might prevent the blank from assuming a true position and resting evenly thereon" (lines 70–87).

Complainants' expert points out another advantage in the construction—*i. e.*,

> "by removing the superfluous material on the interior of the record or blank, a lighter article is obtained and a very considerable saving in mate-

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rial can be secured. Since the material of which the records are made is relatively expensive, this is an important consideration, and lightness is, of course also desirable" (C. R., p. 29, fol. 116).

Concerning this invention, Mr. Edison said:

> "At first the blank was reamed out, tapered, and the inner part was solid, but it was found after a time that a continuous surface did not hold as well on the tapering mandrel, and that wax chips and dirt would get inside and tend to break the cylinder when it was forced on, and also make it run out of true, and therefore an inner rib was cast with the cylinder and this was tapered to fit the mandrel of the phonograph. This permitted of obtaining the outer surface of the cylinder more true when the phonograph was revolved, and to also hold the cylinder with sufficient force so that in the act of turning off the cylinder to make a new record it would not be forced along the taper and loosened. In fact, by this simple device all mechanism for securing the cylinder was dispensed with, and the most inexperienced person could at once put the cylinders on and off the phonograph without any instructions or any skill required, and this form with these ribs has been universal since their introduction, and many millions have been sold. They are employed also by the Graphophone Company and all foreign makers of phonograph cylinders" (C. R., pp. 84, 85, fols. 336, 337).

As a result largely of the inventions of these patents in suit, *first*, making the record with a tapered bore to be received frictionally on a similarly-formed mandrel; *second*, of the same waxlike material throughout so that under changes of temperature the record would shrink or expand uniformly, and, *third*, by forming the bore with ribs or projections, with the several advantages incident thereto, the modern commercial phonograph was produced. Mr. Edison states that:

> "From the time that the first commercial phonograph was put on the market to the present time, there have been upwards of two hundred thousand phonographs sold to the public in all parts of the world, all of which have employed the inventions of the patents in suit. Most of these phonographs have been sold by the National Phono-

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graph Company, and also by another company who sell the phonograph under the name of the 'graphophone', which I license under my patents. In fact, all commercial phonographs which have been sold employ these inventions" (C. R., p. 83, fols. 329, 330).

On the same point, complainants' expert also said :

"The Edison commercial phonograph appeared in 1889, and was substantially identical with the present phonograph, except of course in details which have been worked out since that time. Up to the appearance of the commercial Edison phonograph the original graphophones were in use, and I had occasion frequently to see them. When, however, the perfected Edison phonograph was put on the market, the graphophones practically disappeared, as they were so immeasurably inferior as to be incapable of effective competition with the phonograph. For a year or so after its introduction, the commercial Edison phonograph was practically the only talking machine on the market, and it was not until about 1891 or 1892, as I now remember, that the present graphophone was constructed in competition with that machine, and in which the old cylindrical graphophone records sustained by end disks no longer appeared, but instead thereof the Edison soap record with tapered bore sustained on a tapered mandrel was employed. Suits were thereupon brought on the Edison patents herein involved against the manufacturers of the graphophone, and resulted in the taking of a license under those patents by such manufacturers" (C. R., pp. 45, 46, fols. 180–182).

Thus it will be seen that although the patents in suit represent what Mr. Edison has correctly referred to as "a number of small inventions," those patents must be regarded as very important contributions to this special art. The facts that more than two hundred thousand phonographs have been sold to the public, that many millions of the records have been sold, and that as a result of the inventions the original graphophone was driven from the market, are all strongly indicative, not only of utility, but of novelty. Inventions which revolutionize an industry and which inject the breath of life into an almost inanimate en-

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terprise, can, we submit, be looked upon in no other light than as being useful in the highest sense of the word. We shall show, not only from a consideration of the prior art, but also from defendants' own testimony, that the novelty of the suggestions contained in the patents in suit is undisputed. Two of the necessary elements of patentability, *i. e.*, novelty and utility, being present, we submit that the third element, namely, invention, can be safely presumed to exist.

The Prior Art.

So far as the prior art is concerned, if we limit the same to the present subject with which we are here dealing, we may truthfully say that there is none. Defendants' case rests practically on the testimony of the expert Carter, whose deposition really amounts to an argument, in which the attempt is made to show that the suggestions contained in the patents in suit are lacking in invention. In this deposition a great many references are made to prior patents and practices relating to other and entirely non-analogous arts, and we shall consider these references, with no greater particularity than they deserve however, in our discussion of the defenses which have been raised. So far, therefore, as the prior art as set up by the defendants relates to phonographs, it is limited to the following patents :

Edison, No. 200,521, February 19, 1878 (D. R., p. 171).

This patent covers details relating to the old original tinfoil phonograph. It does not use a cylindrical record or one having a tapering bore, or one formed with ribs or projections for engaging the mandrel. While the record is composed of tinfoil, and hence is in fact formed of the same material throughout, it is not wax-like, nor is it cylindrical, nor is it thick enough to preserve its shape, nor, in fact, does it

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have anything in common with, or relate in any way to, the invention of any one of the patents in suit.

Bell and Tainter, No. 341,214, May 4, 1886 (D. R., p. 195).

This patent describes a record composed of a paper *disk* covered with a waxlike material. It is of course utterly foreign to anything here in controversy.

Tainter, No. 341,288, May 4, 1886 (D. R., p. 213).

This patent describes a record formed of a paper tube covered with a waxlike material, and in fact is one of the very constructions which Edison sought to improve by the inventions of the patents in suit. It does not make use of a record with a tapered bore, or one having ribs or projections for engagements with the mandrel, or one composed of the same waxlike material throughout, and for these reasons is entirely foreign to anything in controversy.

Tainter, No. 375,579, December 27, 1887 (D. R., p. 237).

This patent discloses the exact record of Tainter patent No. 341,288 above considered. While it shows a mandrel formed with a small inclined shoulder at one end, we have before pointed out why such a construction is entirely inoperative. Defendants' expert, in fact, admits that the construction of this patent is not desirable (D. R., p. 89, x-Q. 42).

Edison, No. 393,463, November 27, 1888 (D. R., p. 247).

This patent relates to a machine for reaming out the tapered bores of phonograph records or blanks, and

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why it has been introduced is more than we can understand. It obviously has no bearing on the patents in suit, is of later date, both as to issue and filing, than patents Nos. 382,418 and 382,462, and though earlier than patent No. 414,761 in suit, it shows no ribs or anything remotely suggestive thereof.

Edison, No. 393,967, December 4, 1888 (D. R., p. 251).

This patent is also too late to have any bearing on the first two patents in suit, Nos. 382,418 and 382,462. It does not show a record or blank formed with projections or ribs, and hence has no relation to the third patent in suit, No. 414,761.

Edison, No. 406,571, July 9, 1889 (D. R., p. 254).

This patent relates to a special process for treating phonograph blanks to permit their exteriors to be shaved off smoothly, and has no bearing whatever on the patents in suit; besides which it is later in date, both as to issue and filing, than the first two patents, Nos. 382,418 and 382,462, in suit.

Tainter, No. 421,450, February 18, 1890 (D. R., 259).

This patent relates specifically to the graphophone record described in the Tainter patents above considered and composed of a paper or pasteboard cylinder with a coating of waxlike material. The record is not tapered, nor is it provided with interior ribs or projections, and it is obviously not formed of the same waxlike material throughout.

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Defendants' Expert Admits the Novelty of the Inventions of the Patents in Suit.

From this résumé of the prior art, it is clear that the patents in suit stand on foundations of complete novelty. Nothing even remotely suggestive of the inventions of those patents had been before described or used. This is admitted by defendants' expert. Thus, on the subject of the first patent in suit, No. 382,418, Mr. Carter testified (D. R., p. 84):

> "x-Q. 24. Do you find any instance in the prior art where a phonogram record or blank has been tapered on its bore and engaged with a tapered mandrel, so as to rotate by friction?
>
> "A. I find in the Tainter patent No. 375,579, filed July 7, 1887, and granted December 27 of that year, a phonogram blank frictionally held upon a taper mandrel, so as to rotate therewith by friction. This phonogram blank did not have a taper bore, and in this respect the prior art does not disclose the construction you refer to in phonogram blanks or records, so far as I am aware.
>
> "x-Q. 25. So far as the prior art is concerned, it was a new suggestion, then, to make a phonogram record or blank with a tapered bore?
>
> "A. Confining attention strictly to phonogram records or blanks, it was.
>
> "x-Q. 26. This includes, of course, graphophone records or blanks, or other cylindrical records or blanks for use with talking machines?
>
> "A. Certainly, I make no distinction between the products of different makers in this respect, but understand the word phonogram record or blank to cover such article wherever found or whatever called in the trade."

On the subject of the second patent in suit, No. 382,462, Mr. Carter testified (D. R., p. 116):

> "x-Q. 116. Do you know of any instance in the prior art where a phonographic record or blank has been made of material having the same coefficient of expansion throughout, that material being sufficiently smooth to receive an accurate record, stiff enough to make the record self-supporting, and durable enough to give a number of

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reproductions without objectionable wearing of the record?

"A. No.

"x-Q. 117. Would not a celluloid record be included in this definition?

"A. Yes."

On the subject of the third patent in suit, No. 414,761, Mr. Carter testified (D. R., p. 126):

"x-Q. 149. Do you know of any instance in the prior art where a phonogram record or blank has been provided on its bore with cutaway portions forming ribs for supporting the record?

"A. No.

"x-Q. 150. Do you know of any instance in the prior art where a phonogram record or blank has been provided on its bore with a plurality of ribs or flanges for supporting the record?

"A. No.

"x-Q. 151. Would you include defendants' records in the latter definition?

"A. Yes."

Defendants' Records.

The phonograph records made by defendants (Complainants' Exhibit Defendants' Record) are produced by a molding process (D. R., p. 136, x-Q. 27) and are hence not originals, but are duplicates. As a matter of fact almost all musical phonograph records which are made in this country are duplicates, since the enormous demand could not be supplied if original records were alone made. Defendants' records are composed of a celluloid composition which is "quite heavily loaded with other material, such as metallic zinc" (D. R., p. 129, Q. 8), and therefore are very hard and refractory. Physically considered, these records are provided with tapered bores having two internal ribs or flanges which frictionally engage the ordinary tapered mandrels of standard phonographs and graphophones. In fact defendants' records are sold in the open market in direct competition with the records

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manufactured by complainants, and their only use is in connection with talking machines made by complainants or else by licensees under the patents in suit.

Much stress in defendants' testimony is laid on the fact that defendants' celluloid records are very superior in character to the ordinary well-known Edison soap records as manufactured by complainants. For instance, Mr. Carter says:

> "Celluloid makes a stiff, strong and rigid record cylinder, which if distorted by pressure will resiliently resume its proper shape when released, even when made very thin, the thickness of the cylindric wall in practice being not much over one thirty-second of an inch. Its tensile strength is very high and there is no danger of bursting even such thin cylinders in the act of forcing them upon the taper mandrel of the phonograph, and the general toughness of the records thus made is such that they may be dropped on the floor and thrown about with comparative impunity." (D. R., pp. 55, 56).

While it is no doubt true that a celluloid record is immeasurably tougher than the records made by complainants, Mr. Edison states that celluloid records were made by him six or seven years ago (C. R., p. 88 x-Qs. 25, 26), so that this material cannot have been regarded by him as being desirable. As a matter of fact, a comparative test of the two records will show that so far as the *quality of the reproduction* is concerned, the records made by complainants are very superior to those of defendants. No *novelty* can be claimed for defendants' celluloid records, because this material has been recognized for years as being capable of use in this art, and was well known at the date of the Edison patents in suit. For instance, in Herrington patents No. 397,856 of February 12th, 1889 (application filed June 8th, 1887), and Nos. 399,264 and 399,265 of March 12th, 1889 (C. R., pp. 119, 123 and 127 respectively), celluloid and celluloid compositions are referred to as "suitable materials" for the manufacture of phonographic records and blanks. So far, then, as concerns the special material which defendants use, it

Raymond R. Wile
Research Library

is clear, from a comparative test of the records, that they are inferior in quality to those made by complainants, while from the evidence it is manifest that this fact must have been observed by Mr. Edison at least six or seven years ago when celluloid records were made by him.

Although defendants attempt to justify their infringing acts by alleging that they operate under patents of their own (*answer* in each suit, sections 4 and 5), those patents have not been introduced, nor are they referred to in the evidence. The reference, however, in the Herrington patents *(supra)* to the use of celluloid, shows that that material was well known and available at the date of the Edison patents in suit, so that obviously no patent on such records can be controlled by the defendants. It is, however, unnecessary to speculate on this point, since defendants' failure to produce their patents obviously cannot benefit them.

Whether defendants' celluloid records are superior to complainants' records or not, is, after all, quite unimportant, since the patents in suit relate to structural improvements and not to questions of materials. It may be admitted, for the sake of the argument, that defendants' celluloid records are not only tougher, but are superior in quality to those made by complainants, without affecting the question of infringement. Under the authorities the fact that defendants' manufacture may be an improvement on the patented inventions, does not make it any the less an infringement if it utilizes the inventions of the patents.

Infringement.

Patent No. 382,418.

The first and second claims of this patent are the following:

> "1. A phonogram blank or phonogram having a bore tapered throughout its length, substantially as set forth.

Raymond R. Wile
Research Library

"2. A phonogram blank or phonogram having a cylindrical recording surface and a tapering bore, substantially as set forth."

Concerning these claims, complainant's expert says:

> "The first claim covers broadly any phonograph record or blank with a tapered bore adapted to be received upon a tapered mandrel and having either a cylindrical-recording surface or some other curved-recording surface—for instance, one slightly tapered. At the present time all commercial talking-machine records and blanks of this type are provided with cylindrical-recording surfaces and with tapered bores, so that the thickness of the wall of the blank is greater at one end than at the other, as shown in figure 1 of the patent in question. Yet the first claim is broad enough, for example, to cover a blank the walls of which are of the same thickness throughout, in which case the recording surface would be formed with the same taper as the bore, and that claim is broad enough to also include other constructions of blanks or records which would be perfectly operative. Since defendants' records are provided with cylindrical-recording surfaces, it is not necessary for us to speculate as to what the claim might cover, because it could be limited, if necessary, to a record or blank with the particular form of recording surface, namely, a cylindrical one, which the patent describes, and it still would apply exactly to the construction of records manufactured and sold by defendants herein. The second claim is distinguished from the first in being specifically limited to a cylindrical-recording surface and a tapered bore" (C. R., p. 23, fols. 90–92).

On the subject of infringement, Mr. Dyer, after referring to the fact that defendants' records can "be used interchangably with phonograph and graphophone records," and after describing their general construction, says:

> "In fact, defendants' records are formed with the exact taper that other standard records have, since they are adapted to be received on the same mandrels which standard phonograph and graphophone records have been designed to engage. The only superficial distinction between defendants'

Raymond R. Wile
Research Library

> records and the record or blank of the patent in question is, that with the former a part of the bore is cut away, so that the surface of the bore which engages the mandrel is reduced. Since it is only necessary to engage the record or blank with the mandrel with sufficient friction to cause the record to turn with respect to the recording and reproducing devices, it is evident that the area of the tapered bore which engages the mandrel can be reduced until only sufficient surface is left to provide for the necessary friction " (C. R., p. 24, fols. 94, 95).

Mr. Dyer then refers to the fact that this omission of superfluous material within the bore of defendants' records results practically in the formation of ribs or flanges as claimed in the third patent in suit, No. 414,-761, but says that—

> " for the purposes of the present patent it is unnecessary for me to take this fact into consideration in comparing defendants' records with the claims, it being sufficient to say that the bore of the latter records is tapered precisely as the patent in question recites and for the accomplishment of the same purposes and objects which that patent sets forth. In other words, with defendants' records, they are placed on the phonograph cylinder with the same readiness as the records of the patent in question, they automatically center themselves, and they retain their position by friction alone " (C. R., p. 24, fol. 96).

Defendants' attack on the patent under consideration is directed entirely to the question of lack of invention, and nowhere is the substantial identity between defendants' records and the patented records denied; in fact, Mr. Carter says :

> " Nor is it necessary to discuss these claims with reference to defendants' construction, since as such claims are devoid of any features of patentable novelty, it is idle to consider the question of identity " (D. R., p. 41).

In view of this admission, we assume there can be no question of defendents' infringement of the patent under consideration.

Raymond R. Wile
Research Library

Patent No. 382,462.

The claims of this patent are the following:

"1. A phonogram blank or phonogram constructed wholly of wax or waxlike materials, and having the same coefficient of expansion throughout its mass, substantially as set forth.

"2. A phonogram blank or phonogram constructed as a hollow cylinder wholly of wax or waxlike materials and having the same coefficient of expansion throughout its mass, substantially as set forth.

"3. A phonogram blank or phonogram constructed as a hollow cylinder, with a tapering bore wholly of wax or waxlike materials, and having the same coefficient of expansion throughout its mass, substantially as set forth."

In explaining the meaning of these claims, complainants' expert says:

"The first claim is obviously broad enough to include not only a cylindrical phonographic record, but also a flat or disk-like record such as is used, for example, in the commercial gramophone and other machines of that type. The second claim, although limited to a cylindrical phonograph record or blank, is broad enough to include one having also a cylindrical bore, as was the case with the earliest graphophone records. The third claim is specifically restricted to a cylindrical record or blank with a tapering bore of the type covered for the first time in Edison patent No. 382,418 before considered. The feature of novelty of each of the claims is defined by the statement that the record or blank, whatever its form may be, is always constructed 'wholly of wax or waxlike materials and having the same coefficient of expansion throughout its mass'" (C. R., pp. 26, 27, fols. 104, 105).

On the question of infringement, Mr. Dyer says:

"Defendants' records are made entirely of celluloid throughout, so that said records have the same coefficient of expansion throughout their mass. Those records, as I have before said, are formed with cylindrical recording surfaces and with tapered bores, in these respects conforming to the

Raymond R. Wile
Research Library

terms of the third claim of the patent in question, as well, of course, as to the terms of the first and second claims of that patent, which are more generic than the third claim. Celluloid, for the purpose of a phonographic record or blank, is a waxlike material, because it possesses the desirable qualities of hardness, smoothness and uniformity due to its amorphous character, that any other approved recording material must have. At the present time all phonograph and graphophone records are made of very hard, insoluble soap, to which is added a small proportion of wax, and these latter records are chemically distinguished from wax records, although they are physically waxlike in character. As a material for making a phonograph record celluloid is just as waxlike in character as is the hard, insoluble soap of which other talking-machine records are now and have been made for years" (C. R., p. 27, fols. 106–108).

Is Celluloid Waxlike?

If the view expressed by complainants' expert is accepted, and if the records made by defendants are to be regarded as waxlike in character, there can be no question, of course, as to defendants' infringement of all of the claims of the patent under consideration. Defendants' expert, however, argues that the celluloid records are not waxlike, and, therefore, do not correspond with the terms of these claims. It thus becomes necessary to determine which of these conflicting views is correct, since, if celluloid in this art is regarded as a waxlike material, the claims are certainly infringed.

In the first place it is to be observed that the patent itself does not specifically define the expression "waxlike," although it states that

> "the *most available* SURFACE for phonogram blanks and phonograms is one composed of wax, gum, or other plastic hydrocarbon" (C. R., p. 95, lines 8–11).

Celluloid, according to Mr. Carter, is a hydrocarbon (D. R., p. 116, x-Q., 113), and when heated is plastic (D, R., p. 119, x-Q, 129). So far as the language of

Raymond R. Wile
Research Library

the patent under consideration is concerned, then, defendants' records are certainly comprehended by the terms thereof.

Being asked on cross-examination to define his meaning of the expression "wax" and "waxlike," Mr. Dyer said:

> "So far as physical properties are concerned, a wax is an amorphous material, solid at ordinary temperatures, varying in hardness according to different varieties, of many shades of color, more or less brittle when subjected to considerable cold, and more or less plastic when subjected to heat. A waxlike material, to my mind, might be a material having any of these characteristics, since that expression is broad, but for the purposes of this case I consider a waxlike material to be any amorphous and sufficiently hard substance suitable for use as a phonographic record. It does not seem to me that we are dealing so much with material in the consideration of these patents as we are with mechanical constructions" (C. R., p. 35, x-Q. 22).

The use of the word "amorphous" in this definition was clearly misinterpreted by defendants' expert, who said:

> "Indeed, glass is a most perfect example of an amorphous material corresponding to this definition. Glass is solid at ordinary temperatures. Glass is of varying hardness, according to different varieties. Glass is of many shades and colors. Glass is more or less brittle when subjected to considerable cold, and more or less plastic when subjected to heat" (D. R., p. 60).

In order to justify the statement that glass is an amorphous material, Mr. Carter quotes from Webster the definition, not of "amorphous," but of "amorphism," as "a state of being without crystalization even in the minutest particles, as in glass, opal, etc." If by this definition the lexicographer intended to say that a thing is in a condition of amorphism when it is glass-like in character, then the word in question is certainly antithetical to amorphous. The Standard Dictionary defines the latter word as "without determinate shape;

Raymond R. Wile
Research Library

structureless; unshapen; unshapely; as, amorphous slag, rock, or slime." Webster, the very authority to which defendants' expert refers, defines "amorphous" as being "without crystallization in the ultimate texture of a solid substance," and hence the direct antithesis of glass. Mr. Dyer, in explaining the meaning of his use of the word, said:

> "A good illustration of the difference between an amorphous and a non-amorphous material is found in a comparison between natural chalk and so-called 'French chalk.' The former is a natural deposit resulting from the ossified bones and shells of micro-organisms, and when observed through a microscope these structures are clearly apparent. French chalk is formed chemically by precipitating carbonate of lime, and under the microscope is absolutely structureless. Natural chalk is hence referred to by chemists as non-amorphous, while precipitated chalk is distinguished therefrom as amorphous" (C. R., p. 64, fols. 254, 255).

We believe that the definition of "waxlike," as given by Mr. Dyer, is an entirely reasonable one, and is fully comprehended within the scope of the patent under consideration. Such a definition is certainly not too broad, as appears from Mr. Carter's deposition (D. R., p. 116):

> "x-Q. 116. Do you know of any instance in the prior art where a phonographic record or blank has been made of material having the same coefficience of expansion throughout, that material being sufficiently smooth to receive an accurate record, stiff enough to make the record self-supporting, and durable enough to give a number of reproductions without objectionable wearing of the record?
>
> "A. No.
>
> "x-Q. 117. Would not a celluloid record be included in this definition?
>
> "A. Yes."

Our own view, as well as that of complainant's expert, is that, since the patent under consideration deals entirely with a mechanical question, it is not necessary to look to the chemical composition of a record to de-

Raymond R. Wile
Research Library

termine whether or not it is included within the terms of the claim, but it is only necessary to look to its physical characteristics, and ascertain whether it possesses those waxlike peculiarities as will adapt it to effective use. Mr. Dyer says:

> "After all, the particular attributes of the recording material with which we have most to do in producing a satisfactory phonographic record are its physical structure and the character of its surface. So long as the material is hard enough and is free from grains or fibers which would produce false vibrations of the recording device, or, in other words, so long as it is provided with a smooth and uniform (*i. e.*, waxlike) surface, then it is satisfactory for the manufacture of commercial phonograph records. Such a surface is certainly waxlike, and there would be no other expression which would more clearly and accurately define it" (C. R., pp. 64, 65, fols. 256, 257).

This view of the meaning of the expression "waxlike" is fully confirmed by the record. The Bell and Tainter patent No. 341,214 (D. R., p. 195), in which was described for the first time the making of a record by a cutting or engraving process, made use of the expression "wax or waxlike composition" in many of its claims. In the specification the statement is made that:

> "The invention consists, secondly, in engraving or cutting the record in a *waxy* or *amorphous* and slightly cohesive substance" (p. 1, lines 59–61).

From this it will be seen that Bell and Tainter, as early as 1886, used the expression "waxy" as being substantially synonymous with "amorphous," and thus they recognized, as did Edison, that the essentials of a satisfactory phonograph record resided in its physical, rather than in its chemical, structure. In other words, a satisfactory phonograph record must be one presenting a waxlike or amorphous *surface*, free of grains or fibers, which would produce false vibrations. The Bell and Tainter patent was considered by Judge SHIPMAN in American Graphophone Company vs. Leeds *et al.* (87 Fed. Rep., 873), in which case the argument was made

Raymond R. Wile
Research Library

that the Edison "metallic soap record" was not composed of "wax or a waxlike material." In disposing of this argument, Judge SHIPMAN said:

> "The material which is described in the patent is a waxy or amorphous or slightly cohesive substance, which can readily be cut, and can readily be reformed in chips or shavings. The metallic soap blank is substantially a mixture of stearic acid or stearin and ozocerite, paraffin, and ceresin, and is a cohesive, *waxlike material, without fiber*. Mr. Edison in two patents, Nos. 484,583 and and 484,584, in speaking of the phonogram blanks in use in 1892, says: 'The surface is ordinarily of wax, or a stearate or hard metallic soap or other waxlike material or composition.' The criticism in regard to the material is not well founded."

Here it will be noted that Judge SHIPMAN emphasizes the importance of the physical structure rather than the chemical composition of the record or blank by characterizing a waxlike material as being "*without fiber*."

As opposed to what we regard as a very reasonable definition of a readily comprehended expression, and in opposition to the understanding in the art at the date of the patent under consideration, that "waxlike" is substantially synonymous with "amorphous," the expert for the defendants, Mr. Carter, advances what seems to us to be an untenable argument. In the first place, he calls attention to the fact that the specification does not, in so many words, define the meaning of "waxlike" (D. R., p. 44), and he then refers to the Bell and Tainter patent, in which a waxlike material is used for the cutting or engraving process (D. R., pp. 46–48). Because of this fact Mr. Carter draws this conclusion:

> "At the time of and prior to this Edison patent, therefore, the properties or characteristics most desirable or essential in the recording medium or phonogram blank were recognized to be those by which such blank lent itself most readily to the operation of being smoothly cut or engraved by the cutting style which produced the record groove, and as the substance which at that time

Raymond R. Wile
Research Library

seemed to most fully possess these essential properties or characteristics was wax, or a waxy compound, this designation was employed in the art to describe and define the desired record tablet or phonogram blank material. And this I understand to be what Mr. Edison meant in the patent under consideration, when he claimed his phonogram blank or phonogram 'constructed wholly of wax or waxlike materials'—*i. e.*, a material having those waxlike qualities which rendered it capable of being readily cut or engraved to form the record, as distinguished from being simply indented like the old tinfoil record of his early phonograph. In this view the chemical composition of the substance is an immaterial matter, and obviously as no chemical reaction occurs in the use of the phonogram blank, this must necessarily be so, provided only the composition be such as to be stable and unchangeable under ordinary atmospheric and temperature conditions. Hence, I do not regard the description of the record material as a hydrocarbon (specification, line 11) as calling for that particular character of chemical composition necessarily, but assume that this term was used simply because wax, gum, and similar plastic material are ordinarily hydrocarbons. But I do regard the words of the claim 'wax or waxlike' as necessarily and unavoidably demanding a material of such waxlike or waxy characteristics as will enable it to properly undergo the cutting operation by which the sound record is engraved upon the phonogram blank in the ordinary operation of the modern phonograph and in the ordinary method of producing phonograms for use in the modern phonogram" (D. R., pp. 49, 50).

Mr. Carter then refers to defendants' records, and calls attention to the fact that celluloid is a purely artificial product resembling ivory (D. R., p. 53); that wax is soft and capable of being melted (p. 54), while celluloid is hard and cannot be melted, although becoming plastic (p. 55); and to the fact that defendants' records are made by a molding, and not by a cutting, process, and concludes (p. 58):

> "The waxlike softness of complainants' record or phonogram blank is a necessity of its process of manufacture, and is inevitably required by the

Raymond R. Wile
Research Library

> cutting operation to which it is subjected, while the non-waxlike hardness and toughness of defendants' phonogram is rendered possible by its utterly different process of manufacture and by the fact that it never requires to be cut or engraved."

We observe, however, that, under cross-examination, Mr. Carter states that he would still adhere to his opinion, even

> " if it were possible to make a phonograph record on a celluloid blank by an ordinary Edison recorder without any special treatment of the celluloid, and if by doing so a perfectly legible and satisfactory record is secured " (D. R., p. 118, x-Q. 127).

This argument is one which, we do not think, ought to be adopted. In the first place, it is entirely *unnecessary*, because, as Mr. Carter admits (D. R., p. 116, x-Qs. 116, 117), the patent under consideration is, so far as the prior art is concerned, capable of a broad enough construction to include the records both of complainants and of defendants. In the second place, the argument has no foundation in fact, since in his patent No. 382,419, dated May 8th, 1888 (C. R., p. 115), which issued simultaneously with the patent under consideration, Mr. Edison described a process for making duplicate records, and said:

> " The duplicate phonogram blanks upon which I impress the original record by means of a knurl are preferably of a wax composition, *which is too hard to be practically indented directly in the phonograph*, although softer compositions may be employed, or materials other than wax " (p. 1, lines 61-67).

From this it is clear that at the date of the patent in suit, Mr. Edison had contemplated the use of *a wax composition* which was too hard to be cut or engraved, so that obviously no basis existed for Mr. Carter's argument that a waxlike material under the patent must be one which shall be " readily capable of being engraved by the cutting style or recorder." More than this, as we have before pointed out, celluloid was recognized by workers in this field at the date of the patent

Raymond R. Wile
Research Library

under consideration, as a suitable waxlike material for use in the manufacture of phonogram blanks. In the Herrington patents Nos. 397,856, 399,264 and 399,265 (C. R., pp. 119–127) both celluloid and wax are included in the category of "suitable materials." When the condition of the art at the date of the patent under consideration is understood, there can be no question but that all of the early experimenters recognized that phonograph records could be made, not only by an original cutting or engraving process, but by a duplicating process from materials varying enormously in their chemical composition, as well as in their melting point, from beeswax on the one hand to celluloid and asphalt on the other. In every instance, however, among the many materials referred to in the prior patents, including wax, celluloid, glue, molasses, pitch, asphalt, resin and rubber (C. R., p. 70, fols. 278–280), without a single exception each material was characterized by being amorphous, so as to present a smooth, uniform surface, without fiber, to prevent the generation of false vibrations. It seems to us that the conclusion which should be reached in respect to Mr. Carter's argument is correctly stated by Mr. Dyer in his rebuttal deposition :

> "From what we have said, I think it follows that Mr. Carter, in asserting that the expression 'wax or wax-like material' as used by Edison in the patent in suit now under consideration intended to include only those materials which are 'readily capable of being engraved by the cutting style or recorder,' was actuated more by a desire to so contract the scope of the claims as not to include defendants' celluloid record than by an effort to ascertain the true bearing of the patent with reference to contemporaneous facts. If that had not been his purpose he would not, in my opinion, have adopted so indefensible a position. On the other hand, if he had carefully examined the literature bearing on the question, he would, I believe, have reached the same conclusion as myself—namely, that the expression 'waxlike,' as used by Edison in the patent under consideration, includes all materials having that waxlike quality of surface and physical structure as fits them for use in this special field. He would have found,

Raymond R. Wile
Research Library

by reference to the earliest patent to Bell and Tainter, that ' waxlike ' is used practically as a synonym for ' amorphous.' He would also have discovered, by reference to the patents to Herrington, some of which are very much earlier in date than the application for the patent under consideration, that celluloid and wax are used as equivalent materials. The fact would also have been brought to light that Mr. Edison himself has referred to asphalt as ' waxlike.' And, finally, he would have been brought to the conclusion that wax itself had been described as being incapable of being readily cut, so as thereby to be devoid of the very quality which he believes should be possessed by any substance included in the broad catagory of a waxlike material " (C. R., p. 71, fols. 281-283).

Another consideration which confirms us in our view that for the purposes of this patent celluloid must be regarded as waxlike, is that in Herrington patent No. 397,856, the preferable compound is described as being composed—

> " of celluloid mixed with a smaller quantity of molasses and beeswax, the celluloid and beeswax being dissolved with ether or other suitable solvents before mixing."

The prior art disclosing phonographic records formed of celluloid and beeswax, it follows that by gradually increasing the proportion of the latter material the resulting composition will become more and more waxy in character, while by increasing the proportion of the former ingredient it will become more and more like celluloid. Obviously then it would be impossible to draw any line between pure wax on the one hand and celluloid on the other, so that if celluloid is not waxlike, we will be able to say with certainty the materials on one side of the line are waxlike and on the other side unwaxlike. This difficulty appears from Mr. Carter's cross-examination (D. R., p. 117):

> " x-Q. 120. Please assume one of the Edison soap records made of the same composition to which is added gradually increasing proportions of an ingredient by which the toughness of the re-

Raymond R. Wile
Research Library

sulting record will be increased and its friability reduced. When would such record cease to become waxlike?

"A. I don't know.

"x-Q. 121. Do you entertain any doubt as to the possibility of changing the composition of the Edison soap records to increase their toughness and reduce their friability?

"A. No.

* * * * * *

"x-Q. 123. Assume that in the manufacture of a celluloid composition for use as a phonographic record or blank we add an ingredient to the composition in gradually increasing proportions, so as to gradually reduce the toughness of the resulting record, and gradually increase the friability thereof. Can you state when such records will cease to be celluloidlike?

"A. No.

"x-Q. 124. If in the first case we gradually increase the toughness and reduce the friability of an Edison soap blank, we gradually approximate toward celluloid in this respect, do we not?

"A. Yes.

"x-Q. 125. And if in reducing the toughness and increasing the friability of celluloid blanks in the second case we gradually approach the qualities of the soap records in these respects, do we not?

"A. Yes.

"x-Q. 126. And you are unable, as I understand it, to draw any definite line in the assumed case so that waxlike blanks will fall on one side and celluloidlike blanks will fall on the other side?

"A. That is correct; I am unable to draw any such line."

Mr. Carter was quite right in making this admission. As we view the matter, there is no distinctive and characteristic difference between celluloid and wax so far as those materials are useful for the manufacture of phonographic records or blanks. One is plainly the equivalent of the other, and at the date of the patent under consideration the two materials were so regarded and were associated with each other for this purpose. One was as common as the other. The early inventors recognized that compositions of celluloid and wax

Raymond R. Wile
Research Library

could be used, so that the two materials were not only employed interchangeably, but were utilized together. Hence no clear line of demarcation existed between them, and for the purposes of the art one was the same as the other.

It is hardly necessary to burden our consideration of the case with a discussion of that part of Mr. Carter's argument in which he attempts to show that a celluloid record cannot be regarded as waxlike even if the expression is taken in its ordinary sense and without the attempt to give it any special meaning as including only a material which shall be capable of being readily cut or engraved. It was, of course, admitted that generally speaking a waxlike material was one that resembled wax in appearance (D. R., p. 103, x-Q. 83), or in softness (x-Q. 84), or in plasticity (x-Q. 85), or in adhesiveness (x-Q. 86), or in physical structure (x-Q. 87), or in pliability (x-Q. 88), or in being yielding or impressionable (x-Q. 89). Being then asked (x-Q. 93) if it were not a fact that celluloid possessed the property of wax in presenting "under normal temperatures a smooth unglazed surface," Mr. Carter stated that this was so, but that it was also true "of almost every other material which might be mentioned." He was then requested to point out other materials as closely resembling wax as celluloid in this respect (x-Q. 94), and in response to the question he referred to wood, iron, stone, gutta-percha, unglazed pottery, vulcanite fiber, leather, paper and bone. Being then asked if it were not a fact that celluloid, like wax, "softens by the application of heat and hardens by the application of cold," he stated that this also was the fact, but that it was true "of a very large proportion of known materials." Reference was then made to Mr Carter's list of materials as waxlike in appearance as celluloid, and he was asked if it were true that wood, stone, unglazed pottery, vulcanite fiber, leather, paper and bone possessed the second waxlike property of celluloid, of becoming softened by the application of heat (x-Q. 99). As possessing this latter property, Mr. Carter referred to stone, pottery and

Raymond R. Wile
Research Library

wood, but it is obviously absurd to say that either of these materials is plastic under any conditions which would make it satisfactory for use in this art. Of all the materials, then, which Mr. Carter refers to as being as waxlike in appearance as celluloid, the only material also possessing the waxlike property of plasticity is gutta-percha, which, for our present purposes and according to Mr. Dyer's view, is essentially waxlike in character. Even if gutta-percha were not waxlike for the purposes of the present case, Mr. Carter admits that in color he could not distinguish a sheet of celluloid from a sheet of wax (D. R., p. 105, x-Q. 96), so that when Mr. Carter's deposition is analyzed, we find that, having to do solely with three characteristics of wax, *i. e.*, color, the character of surface and plasticity, the only material known to Mr. Carter as possessing these properties is celluloid.

On the whole, therefore, considering these conflicting views of the two experts, we submit that the opinion expressed by Mr. Dyer is reasonable, in harmony with the terms of the patent and expresses the meaning which the patentee had in mind and which was clearly understood at the date of the patent, while, on the other hand, the view expressed by Mr. Carter, on his own admission, seeks to limit the patented invention to an unnecessary extent, and is supported neither by reason nor by the facts.

Patent No. 414,761.

The claims of this patent which are alleged to be infringed are the following:

> "1. A tubular phonogram blank provided with internal ribs or projections, substantially as set forth.
>
> "3. A tubular phonogram blank made of molded material and molded with ribs or projections on its inner surface, substantially as set forth."

As to the scope of these claims, it is obvious that the first claim covers broadly any phonogram blank or

Raymond R. Wile
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record made in the general form of a tube and provided with internal ribs or projections which engage the phonograph mandrel, instead of with a smooth, continuous bore as with the record or blank of the Edison patent No. 382,418. The third claim is limited to such a blank or record made of molded material, the ribs or projections referred to being integral with the record or blank, and hence being formed by the same molding operation. On the question of infringement of this patent, the experts' views are again in opposition, Mr. Dyer's opinion being that defendants' records are included within the terms of these claims, and Mr. Carter being contrary minded. We shall therefore briefly consider these conflicting expressions of opinion in order to determine which of the two is the more reasonable one.

On the point Mr. Dyer (C. R., p. 30, fol. 120 *et seq.)* said :

> " Referring now to defendants' records, I find that they are formed with internal ribs or projections which engage the mandrel with sufficient friction to properly rotate the record with respect to the recording and reproducing devices. In other words, with defendants' records the superfluous material on the interior of the blank is removed, thereby not only effecting a considerable saving in the weight of material in the blanks, but also securing the different advantages to which the patent in question refers. It is true that in the patent in question there are a series of supports on the interior of the blank or record for engagement with the mandrel, whereas with defendants' record the ribs or projections are formed only at the ends of the record. This, however, is not a difference of substance, since it is only necessary to make the ribs or projections of sufficient area or surface to give the desired friction when the record is engaged with the mandrel. It is perfectly evident that if two ribs of defendants' record did not give a sufficient frictional engagement with the mandrel to properly turn the record, it would only be necessary to employ one or more additional ribs intermediate of the same to secure the desired increase of area. When Edison suggested the feasibility of removing the

Raymond R. Wile
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> superfluous material on the interior of the record or blank, his invention was, of course, not confined to any particular arrangement or number of ribs that might be used."

When this patent was considered by Mr. Carter, he expressed the view that the claims in question would be valid if limited by implication to the formation of a *spiral* rib on the bore of the record, although he admitted (D. R, p. 125, x-Q. 148) that the claims as so limited could not be distinguished from the second claim, which does, in fact, specifically cover such a construction. Unless the claims are so limited, he expresses this view :

> " What they then purport to cover is nothing more than the ordinary and universal practice, common for generations, if not for centuries, of cutting or boring out the interiors of cylinders, drums and hubs generally, for the purpose of reducing the machine work necessary to ream or cut them out to fit the mandrel or shaft upon which they are designed to be placed, and for the purpose of saving weight and material " (D. R., p. 67).

In order to illustrate this practice, reference is then made to " Defendants' Exhibit L " (D. R., p. 159), which illustrates a sectional view of an Edison electric generator. Regarding this exhibit, we direct attention to the fact that nothing is indicated therefrom whether the armature or commutator is held frictionally on the shaft or not, and this is admitted by Mr. Carter (D. R., p. 126, x-Q. 152). In fact, as Mr. Carter says in his same answer, the exhibit illustrates keys for locking the armature and commutator to the shaft so as to cause them to positively rotate. It is also a fact that with this exhibit the shaft is not tapered, so that in this respect Mr. Edison's idea is completely wanting. Furthermore, it is obvious that the exhibit in question has no analogy whatever to the present art, and if it did in fact represent the exact counterpart of the Edison invention, we should still argue under the authorities that owing to its nonanalogous character—to its complete irrelevancy—it could not be relied upon in anticipa-

Raymond R. Wile
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tion of the claims. Finally, we insist that the Edison invention of forming ribs or projections on the bore of a phonograph cylinder possesses special utility in this particular art in forming the cylinders to be always accurately centered. The difficulties in this latter respect encountered by Mr. Edison in practice are referred to by him (C. R., fol. 336 and fols. 347, 348). We therefore see no necessity for limiting the claims in any way. Their language is perfectly plain, and even when given their broadest interpretation they are fully distinguished from the practice referred to by Mr. Carter and shown in Exhibit L. The substantial novelty of the invention covered by the claims is also acknowledged by defendants' expert, from whose cross-examination we quote (D. R., p. 126):

> " x-Q. 149. Do you know of any instance in the prior art where a phonogram record or blank has been provided on its bore with cutaway portions forming ribs for supporting the record?
>
> " A. No.
>
> " x-Q. 150. Do you know of any instance in the prior art where a phonogram record or blank has been provided on its bore with a plurality of ribs or flanges for supporting the record?
>
> " A. No.
>
> " x-Q. 151. Would you include defendant's records in the latter definition?
>
> " A. Yes."

If the claims are to be given their rational and obvious meaning, we do not understand that infringement will be seriously disputed. It is true that Mr. Carter states on this question " that defendants' celluloid records are not molded " (D. R., p. 68), but the first claim contains no reference to the process by which the records are made. The third claim is limited to a record " made of molded material and molded with ribs or projections," and it is because of this limitation that its infringement is denied by Mr. Carter. On cross-examination, however, his view was decidedly modified:

> " x-Q. 130. Why, then, cannot celluloid records be molded, if they can be thus forced in a plastic condition around a forming die?

Raymond R. Wile
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> "A. I think you will find that I have nowhere said that they could not be molded, but only that they could not be melted and cast in a mold in the manner which the patent contemplates, or as iron castings are made. It is evident that any material which can be made plastic can be molded in the sense that it can be forced by pressure to assume the shape of any vessel which surrounds it. Indeed, the very process which defendants employ in making their records may be said to be a process of molding, since it involves the conforming of the celluloid to the surface of the surrounding mold by heat and pressure" (D. R., p. 119).

If, therefore, the method followed by defendants is a process of molding, then obviously, on Mr. Carter's own admission, the exact limitations of the third claim are utilized by defendants. Of course, there is nothing in the opinion advanced by defendants' expert on cross-examination that the claim must be limited to a process of *casting* the records, since its language is broad enough to include any molding process. In a case where, on defendants' own admissions, the patented invention is novel (D. R., p. 126, x-Qs. 149, 150, 151), there is no necessity for injecting limitations into the claims by which the defendants may escape the penalty of their infringing acts.

THE DEFENSE OF LACK OF INVENTION.

As we have already indicated, the *novelty* of the patented devices is not questioned by defendants; neither is the *utility* of those devices disputed by them. Their expert does, however, argue that the patented devices are lacking in invention—in view not only of the phonographic art, but of other and quite remote arts.

This argument we propose to consider in detail, in order that its numerous errors and general inconclusiveness may be pointed out.

Raymond R. Wile
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Patent No. 382,418.

The defense of lack of invention, when it comes from an admitted infringer to defeat the patent on a device which made the modern phonograph a possibility and whose novelty is not denied (D. R., p. 84, x-Qs. 24, 25, 26), should be accepted only in the clearest kind of a case.

Although the answer in each suit sets up more than a hundred prior patents, granted not only in this country but practically all over the world, in anticipation of an extremely simple invention, yet when defendants came to the taking of testimony they relied, in defense of the patent under consideration, on twelve prior patents (eight of which we have already considered under the subject of the prior art, while the remaining four patents were not referred to in the answer), as well as upon a number of exhibits, lettered from A to K inclusive, which were also not set up in the answer and which relate to well-known practices in connection with the turning of metal. It would seem that with such a very simple invention as that with which we are here dealing, if it were old it ought not to be necessary to refer in the aggregate to more than a hundred exhibits. One exhibit alone clearly showing the invention would be enough ,and the tremendous mass of literature which defendants have had to peruse in the effort to anticipate, offers a strong *prima facie* presumption of entire novelty. When we consider the argument presented by defendants' expert in which he endeavors to show that the patented improvement is lacking in invention, we shall find that it is not only specious, but is based on a misapprehension or a misinterpretation of the several alleged references.

Of the several exhibits to which Mr. Carter refers in his efforts to anticipate a very simple invention, exhibibits A, B and C show the ordinary tapered live and dead centres of lathes forced in tapered openings in the ordinary live and dead spindles respectively; Exhibits E, F, G, H, J and K illustrate the common

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expedient of forcing taper-socketed chucks upon the tapered ends of live centres. In these exhibits there is nothing even remotely analogous to Edison's suggestions of mounting taper-bored phonograph records or blanks on a tapered mandrel. It is true that Mr. Carter, in his introductory remarks (D. R., p. 29), and before he had occasion to specifically consider the references on which he would be expected to to justify his observations, said:

> "If one wishes to fit a plug tightly in an aperture, he makes them wedge-shaped. If the parts are round the wedge is called a taper, and if the outer or enclosing part is turned off concentrically with the axis of its socket, it is a cylinder having a concentric taper bore; and this cylinder is then in every essential the claimed invention of this Edison patent No. 382,418 in so far as that patent is alleged to contain any feature of novelty."

We have no means of knowing what the expert had in mind when he referred to the "outer or enclosing part," but we assume that he referred to the ordinary chucks shown in Exhibits H to K respectively. At any rate, these exhibits, of all that Mr. Carter has referred to, most nearly comply with the conditions of his statement. Mr. Carter's position, then, amounts to his saying that if the chuck shown in Defendants' Exhibits H to K is turned off so as to present a smooth cylindrical surface, it will anticipate the Edison invention, since it will then represent a cylinder having a tapered bore carried frictionally on a tapered mandrel. Of course the absurdity of such an argument is apparent from its mere statement. Mr. Carter fails to observe that a chuck is never "turned off concentrically with the axis of its socket," and would never be so formed, and consequently would never be the equivalent of the Edison invention. Furthermore, a taper-socketed chuck in lathe practice is not a piece of "work" on which a cutting operation is performed, as is the case with the taper-bored phonograph blank, nor does it carry a sound-record surface or anything remotely suggestive thereof from which sounds are reproduced, as with a phonograph record, but it is a

Raymond R. Wile
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separate tool which itself supports the "work" which requires to be operated upon. Defendants practically admit this, as appears from Mr. Carter's cross-examination (D. R., p. 87).

> "x-Q. 35. Do you find, prior to the patent in suit, any instance in any art—analogous to phonographs or not—where taper bored work has been carried on a taper mandrel by friction, the work having a cylindrical outer surface concentric with the bore?
>
> "A. That depends on what you call 'work.' Almost all chucks of the character I have referred to, and such as are shown in the exhibits, have a cylindrical outer surface concentric with the bore, and, as before pointed out, are carried on a taper mandrel by friction. The dental polishing tool of Locke, shown in patent No. 170,178, has a polishing sleeve D of sandpaper or the like, which has a tapered bore and is supported on a taper mandrel by friction. This sleeve has a conical outer surface, which is one form of cylinder in the broad sense of that term. Moreover, every twist drill almost—and a great variety of other tools—possesses essentially all of the elements of the construction you assume, considered with respect to their ordinary mounting, which is by the insertion of a tapered shank on the drill in a taper socket in the supporting spindle of the lathe or drilling machine. The outer surface of twist drills is cylindric and is perfectly concentric with the tapered shank, and, as I have previously pointed out, it is a mere reversal to make the taper socket on the driven part or work and the taper spindle on the mandrel instead of placing the taper socket in the spindle or mandrel and the interfitting tapered shank on the driven tool or drill."

The character of the entire deposition of this expert is indicated by this answer. Here the opportunity was given to refer to a single instance, analogous or not, in which a cylindric piece of work was provided with a taper bore and was carried frictionally on a tapered mandrel. If such a practice had been known, it would have been a simple matter for the witness to have said "yes, such a construction is shown in this or that exhibit." As a matter of fact, the only things

Raymond R. Wile
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the witness referred to were chucks and twist drills as shown in Exhibits F to K, respectively, which are independent tools and are not cylindrical, and to a patent which will be presently referred to, concerning which the argument had to be made that a cone "is one form of cylinder in the broad sense of that term"!

The only other exhibit in the lathe practice referred to by defendants' expert (Defendants' Exhibit D) is regarded by him as—

> "perhaps not quite so much in point, for the reason that the essence of the claim of patent 382,418 relates to the tapered bore, and not to a tapered mandrel (although of course a taper mandrel is necessarily implied as a means of using the taper bored blank), whereas Exhibit D, while it shows a tapered mandrel, does not show a tapered bore in the work placed upon the mandrel, except as the bore of the work is forced into a tapered shape by the compression of the material surrounding it when wedged upon the mandrel" (D. R., p. 79, x-Q. 13).

In Exhibit D, as appears from the text of "Modern Machine-Shop Practice" from which it is taken, the mandrel is given a hardly perceptible taper (only one in eight thousand), as Mr. Carter admits (D. R., p. 79, x-Q. 12), and the purpose of this slight taper is stated to be

> "to accommodate any slight variation in the diameter of holes bored by standard reamers, which gradually reduce in diameter by wear."

In other words, if these standard reamers did not vary in diameter, a perfectly cylindrical mandrel would be used. Obviously it would be impossible to properly support a cylindrically bored metal cylinder on a mandrel having any considerable taper, for the reason that in that case only one edge of the work would engage the mandrel, and the work would be carried in the same wobbling manner as characterizes the supporting of the graphophone record in Tainter patent No. 375,579. Mr. Carter is therefore quite right in practically excluding Exhibit D from his category of alleged anticipating devices, as it shows absolutely no

Raymond R. Wile
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equivalent for the taper bore, which is thevital feature of the patent under consideration.

After referring to the several exhibits in the art of lathe practice above considered, Mr. Carter expresses the opinion that these suggestions anticipate the patented invention for the reason that

> " a phonograph is nothing in the world but a special form of turning lathe, while the phongram blank is merely a special kind of cylindric work which is cut in a particular manner by this special lathe, and which in order to be thus cut is placed upon a taper mandrel, just as the work to be turned in a lathe is mounted " (D. R., p. 38).

In expressing this view, defendants' expert wanders into the field of romance. What possible justification was there for the statement on Mr. Carter's part that a phonograph record was " placed upon a taper mandrel, *just as the work to be turned in a lathe is mounted*" ? Nothing of this kind is disclosed by the references in lathe work, the nearest approximation of which is to be found in the chucks shown in Exhibits F to K, and which, by no stretch of the imagination, can be referred to as " work," or be regarded as cylindrical. In fact, as we have before pointed out, Mr. Carter practically admits that no such suggestion as this does in fact occur in the prior art (x-Q. 35). We do not admit that a phonograph " is nothing in the world but a special form of turning lathe." The differences between those devices was pointed out by Mr. Dyer, who said :

> " With a lathe, the cutting tool is rigidly mounted in a carriage and does not partake of movement with respect to the same. In a phonograph, the recording or reproducing device which is carried with respect to the work is also vibrated radially many thousand times per second. In a lathe, the surface speed with which the work may move with respect to the cutting tool is unimportant; whereas with the phonograph, the record or blank must be turned at an absolutely uniform speed in order that the pitch of the sounds may be accurately recorded or reproduced " (C. R., p. 53, fols. 210, 211).

Raymond R. Wile
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Defendants' expert was evidently impressed by the fact that his references to lathe practice had not fully supported his prefatory claim that they show "a cylinder having a concentric taper bore * * * in every essential the claimed invention of this Edison patent" (D. R., p. 29), because in his deposition he refers to a number of other patents and practices in other arts.

Bearing in mind that the thing with which we are here dealing is a simple expedient of making a phonograph record with a tapered bore and supporting it frictionally on a tapered mandrel, it strikes us as the height of absurdity that such a mass of alleged anticipations should have been brought into the case. In order that our discussion of these additional references may be curtailed as much as possible, we adopt as our own the following summary, which we take from Mr. Dyer's deposition (C. R., p. 55 *et seq.*):

> "*Birkmann Patent.* This patent shows an ordinary taper-bored chuck supporting the tapered shank of a drill, and, according to Mr. Carter, it does not add anything to Defendants' Exhibits A to K inclusive (x-Q. 43).
>
> "*Abbe Patent.* In this patent a polishing wheel is provided with an elastic hub which is forced over a taper mandrel. Mr. Carter is unable to say whether the hub is taper-bored or cylindrically-bored (x-Q. 50).
>
> "*Locke Patent.* This patent relates to a dental polishing tool in which a cap or cone of emery paper is slipped over a tapered arbor, being held in place by an interposed layer of rubber. The patent is entirely non-analogous to the phonographic art, besides which the polishing cone of Locke is not open-ended like a phonographic record or blank, nor is it provided with a cylindrical outer surface, as with the latter element.
>
> "*Phillips Patent.* In this patent a spool is carried on a tapered shaft. Considering this patent Mr. Carter states (x-Q. 55) that:
>
> > "'It has a bore tapered throughout its length and a cylindric outer surface concentric with the bore, and in this respect it is as closely related as any of the other references.'
>
> "In stating that the spool of the Phillips patent is taper bored, Mr. Carter goes entirely outside of

Raymond R. Wile
Research Library

the specification, in which no reference is made to the form of the bore. Spools, as is well known, are not taper bored, but are cylindrically bored. Since the specification of the Phillips patent states that the spool is placed on the shaft 'by forcing the latter through the spool axially,' it is quite clear to my mind that the spool is not taper bored, since in that case no 'force' would be required to insert the shaft through the spool. The only ground upon which Mr. Carter bases his statement that the spool of the Phillips patent must be taper bored is that it

> "'would be cracked and the spool destroyed before its bore could ever be forced to assume a taper form of the degree shown in this drawing' (x-Q. 63).

"Nothing appears in the patent as to the material of which the Phillips spool is made, and it well might be formed of some elastic substance, as in the Abbe patent. Furthermore, the patent is entirely silent as to the amount of the taper of the shaft, so that the latter might be well within the elastic limits of wood. In thus construing the Phillips patent, Mr. Carter has no hesitancy in assuming that the taper of the shaft is so great, and the character of the material of the spool is so non-elastic, that the bore of the latter must be tapered; yet, in doing so, he overlooks the common and obvious fact that spools are all cylindrically bored and not taper bored. A fair interpretation of the Phillips patent, in the absence of any definite statement as to the form of the bore of the spool, would be to assume that an ordinary cylindrically-bored spool was used, which was *forced* upon a shaft, the taper of which was not so extreme as to cause the spool to crack. In the absence of any definite description in the patent, therefore, as to the exact construction of the spool, I do not regard the patent as being in any way suggestive of Edison's invention. Furthermore, a spooling device is certainly non-analogous to the art of phonographic recording and reproduction, and Mr. Carter admits (x-Q. 55) that it is 'not as closely related to the phonographic art as is the art of turning and lathe work.'

"*Wheeler & Wilson No. 8 Sewing Machine.* This machine was examined by Mr. Carter about a month previous to the time when his deposition was given (x-Q. 71), so that it does not antedate

the Edison patent. Concerning the bobbin of this machine, Mr. Carter states that:

> 'Apparently, at the time I saw it, it was tapered from the midd'e toward each end—*i. e*, it was worn out to a larger diameter towards each side of the bobbin, as by being repeatedly forced upon the tapered spindle indiscriminately from either side.'

" Obviously, this requires no further comment.

" *Clock Hour Hand.* Although Mr. Carter states in his direct examination that the 'sleeve which supports the hand' is 'ordinarily bored out on a taper to fit over the rotating sleeve of the clock movement,' yet I observe on cross-examination he was not personally familiar with this practice prior to the date of the Edison patent (x-Q. 73), nor is he able to make any definite statement of a knowledge 'of the sleeve of a clock movement for receiving the hour hand being made with a taper' (x-Q. 75)."

Complainants' expert, after reviewing the deposition of Mr. Carter, was unable to agree with the latter's conclusions as expressed by him (D. R., p. 40), and thus summarized his own position:

> " On the contrary, the facts appear to be otherwise than as stated by Mr. Carter. The blank or record of the patent under discussion is *not* 'to all intents and purposes the old phonogram blank of the Tainter patent,' for the reason that it is a blank or record the essential and avowed purpose and intent of which is to be capable of ready engagement with and disengagement from the mandrel, and hence the very antithesis of the Tainter construction. It is *not* 'practically identical in construction' with the old blank, for the reason that one is taper bored and the other cylindrically bored, and one is received on a tapered mandrel and the other on a cylindrical mandrel. It is *not* 'absolutely identical in operation with the old blank,' for the reason that it is readily applied to or withdrawn from the mandrel, and always retains its firm frictional engagement therewith under all conditions of climate and temperature; while the other is, under the most favorable conditions, only with difficulty applied to or withdrawn from the mandrel, and, under some condi-

Raymond R. Wile
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> tions, is so loose as not to turn frictionally, while under other conditions it cannot be engaged with the mandrel at all. It, furthermore, is not a fact that Mr. Edison adopted 'the ordinary expedient which was generally employed by mechanics in similar situations everywhere,' for the reason that no instance has been given where anything analagous to a phonograph record or blank, or in fact any similar cylindrical object, has been supported, as suggested by Mr. Edison. And, finally, not only did the suggestion of a taper-bored blank or record frictionally engaging a tapered mandrel involve invention, in my opinion, and invention of a very meritorious character, since it made the modern phonograph a success; but that invention was made only after other ingenious inventors had been struggling for a number of years towards the goal without receiving any light from the prior art, and who in fact even when that invention was made, were still following the wrong path" (C. R., pp. 58, 59, fols. 232-236).

We submit, therefore, that the alleged defense on the point of lack of invention against the patent under consideration is without merit, since nothing has been produced in any way suggestive of that invention from which a conclusion can be drawn to negative the patentable character thereof. If any instance had been given in which some sort of a cylindrical piece of "work" had been provided with a tapered bore and had been carried frictionally on a tapered mandrel, then the question would be fairly presented whether the use by Edison of that suggestion in phonograph records did or did not amount to invention. But nothing of the kind has been disclosed by the record, and so far as the present case is concerned, the patent under consideration must be regarded as covering a basic invention for which there is no analogy either in the phonographic art *or in any other art.*

Patent No. 382,462,

So far as this patent is concerned, the denial of infringement by defendants constitutes the only defense which is seriously presented, and we have already con-

Raymond R. Wile
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sidered this question and have shown, we think, that celluloid must be regarded as "waxlike" and hence be included within the scope of the claims. Defendants' expert in his deposition does, however, briefly refer to another defense, namely, that the patented improvement is lacking in invention. It will be remembered that so far as the prior art relates to phonographs (as represented in the patent to Bell and Tainter No. 341,214, the patents to Tainter Nos. 341,288, 375,579, 380,535 and 421,450, and Herrington patents Nos. 397,856, 399,264, 399,265 and 464,476), it discloses only the making of phonograph records, both disk-like and cylindrical, with paper backings coated with a wax or wax-like material. These records were objectionable and practically worthless owing to the fact that under changes of temperature the wax or wax-like material expanded and contracted more rapidly than the paper backing, so that in the former case wrinkles and in the latter case cracks would develop in the recording surface. Owing to the extremely delicate character of the phonographic impressions, these disturbances in the record surface were obviously fatal to commercial success. On this point Mr. Edison said:

> "It was found essential that the blank should be made wholly of the same material or two materials both having the same coefficient of expansion. A large number of attempts were made to form a compound cylinder with wax for the outer recording material, but on account of not being able to obtain a cylinder the inner portion of which had the same coefficient of expansion as the outer, the compound cylinder had to be abandoned, on account of the large amount of breakage due to shipment and changes of temperature. Finally a cylinder made entirely of the same material was adopted, and this is shown particularly in patent No. 414,761" (C. R., p. 84, fols. 334, 335).

At the present time this improvement is utilized in connection with all of the phonographic records made and sold in this country and elsewhere throughout the world, not only by complainants, but also by licensee

Raymond R. Wile
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under the patent, as well as by defendants themselves. As Mr. Edison has said, many millions of such records have been sold (C. R., p. 85, fol. 338). Owing to the admitted commercial importance of the present improvement and its acknowledged utility and novelty, any such general defense as that of lack of invention should be accepted with great caution and the allegations in support thereof be subjected to the closest scrutiny. The patent is at least *prima facie* valid, and the presumption is greatly strengthened by the facts that the improvement is new, is highly useful, and has been adopted by defendants.

Mr. Carter's argument on the question of the alleged lack of invention in the improvement covered by the patent under consideration is thus stated by him:

> "Cylindric phonogram blanks or phonograms having a thin surface of wax or waxlike material to receive the sound record have been shown to have been, and admittedly were, old at the date of this alleged invention, and to simply thicken this surface until it becomes a body or layer sufficient of its own strength and without a special strengthening backing to stand alone and resist the known strains incident to its use, seems to me to be the most obvious of expedients and a most inevitable development of the art. And in this connection it will be noted that there can be no contention made here of a long-felt want which others recognized, but were unable to fill, the fact being that this patent was brought out at the very infancy of the art and is in itself proof that the want was immediately felt and as immediately and naturally supplied. How, indeed, could it have been otherwise? One of the obvious requirements of a phonogram blank for ordinary commercial use is that it shall be capable of being used over again after its first record has ceased to be of value or interest. And the most obvious way to prepare its cylindric surface for a new record was to pare or shave off enough of the easily cut wax or waxlike material to leave a fresh cylindric surface ready for a subsequent cutting operation. But in order to be capable of being repeatedly pared or shaved off, the wax surface

Raymond R. Wile
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must necessarily be of some considerable thickness, and when made thick enough it required no backing. The progress in the development of the art from a wax-surfaced cylinder merely, to one constructed wholly of wax, because made so thick as to require no strengthening backing, was thus but a natural mechanical sequence which must inevitably have occurred, regardless of any particular workers along this line" (D. R., pp. 63, 64).

Concerning this argument we submit the following:

I. In the first place, the contention is pure argument, and is not based upon any special knowledge of the art as will enable the expert to speak with any authority. He says, in fact:

> "I have no knowledge whatever of this development except that which I gained from a study of the patents relating to this art, all of which, issued prior to 1890 or '91, I have examined more or less carefully. My first actual experience with phonographs and phonographic records and blanks occurred in the winter of 1891-2" (D. R., p. 125, x-Q. 145).

II. If the expert had carefully examined the prior patents, as he says, and had drawn an unbiased conclusion therefrom, he would certainly not have expressed the view that there was no

> "long-felt want, which others recognized, but were unable to fill, the fact being that this patent was brought out at the very infancy of the art and is in itself proof that the want was immediately felt and as immediately and naturally supplied" (D. R., p. 64).

As a matter of fact, the prior art shows that the objectionable composite records were suggested many years prior to the patent in suit, and were used by subsequent inventors without change during the entire intervening period, For instance, in Mr. Edison's patent No. 200,521, of February 19th, 1878, a composite record is described as being composed of

> "soft paper saturated or coated with paraffine or similar material, with a sheet of metal foil on

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> the surface thereof to receive the impression from the indenting point" (D. R., p. 172, bottom 1st column).

When the work on the graphophone was taken up, Bell and Tainter, in their patent No. 341,214 filed June 27th, 1885, still retained the composite record, and describe it as being "composed of a wax or waxy surface on a paper or pasteboard foundation" (D. R., p. 195, lines 67-69). In Tainter patent No. 341,288, filed December 4th, 1885, the record is described as consisting

> "of a hollow cylinder or tube of paper or other suitable material, coated with wax or waxlike composition" (D. R., p. 213, lines 16-18).

In Herrington patent No. 464,476, filed September 11th, 1886, the record is described as being composed of a waxlike material

> "applied as a coating to a suitable supporting thread, strip or sheet of metal, fabric, paper or rubber" (C. R., p. 133, lines 40-43).

In Herrington patent No. 397,856, filed June 18th, 1887, the record is composed of a waxlike material "upon the surface of a thin flexible strip" (C. R., p. 119, lines 25, 26). In Tainter patent No. 375,579, filed July 7th, 1887, the record is described as

> "consisting of a paper tube or cylinder provided with a coating of wax or waxlike composition" (D. R., p. 237, lines 18-20).

In Tainter patent No. 421,450, filed November 14th, 1887, the record is composed of a waxlike composition "spread in a thin layer on a suitable base or foundation such as paper or pasteboard" (D. R., p. 259, lines 20, 21). Edison patent in suit No. 382,418, filed November 26th, 1887, still adhered to the composite record described as

> "a cylindrical recording surface, *s*, made of wax or a waxlike substance, which may be mounted upon a backing" (C. R., p. 91, lines 37-39).

In Tainter patent No. 380,535, filed December 2d, 1887, the record is not described, but it is clearly

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illustrated (C. R., p. 106) as being composed of a paper backing with a wax coating. And, finally, in Herrington patents Nos. 399,264 and 399,265, both filed September 21st, 1888, the record is described as consisting of "a phonograph cylinder with a coating of wax or composition" (C. R., p. 123, lines 25, 26, and p. 127, line 16).

From this review of the case, it will therefore be seen that composite phonograph records were described as early as 1878, and were employed universally by all the experimenters in the art up to and actually beyond the issue of the patent in suit. Such a review is certainly an eloquent contradiction of Mr. Carter's statement that the patented improvement "was brought out at the very infancy of the art." If the improvement was obvious, it is certainly remarkable that the skilled inventors who were endeavoring to perfect the phonograph should have clung so persistently and for so long a time to the old objectionable structure. And it is highly significant that upon the introduction of the patented records, the old composite records should have been completely displaced and are now regarded as mere curiosities, if in fact any of them are in existence at this time.

III. Mr. Carter's assumption that the invention of the patent under consideration was developed because of a need for the production of a record which should be capable of being pared or shaved off to permit of its receiving successive phonographic impressions, is also completely disproved by the briefest consideration of the prior art. That was not a necessary desideratum, and nothing whatever is said in the patent under consideration of this feature. From the very inception of the art, inventors have recognized the fact that records could be made by a duplicating process, as is the case with both complainants' and defendants' records at this time. Thus, in Mr. Edison's patent No. 200,521 of 1878, he states that the record

> "may be stereotyped by means of the plaster-of-Paris process, and from the stereotype multiple

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copies may be made expeditiously and cheaply by casting or by pressing tinfoil or other material upon it. *This is valuable when musical compositions are required for numerous machines*" (D. R., p. 172, 1st column).

This idea of making duplicate records as distinguished from original ones was still in Mr. Edison's mind when the patent under consideration was issued, because in Edison patent No. 382,419 (filed March 8th, 1888, C. R., p. 115) an elaborate process is described for duplicating phonographic records by knurling, and in this patent, it is interesting to note, the modern record is described composed of the same material throughout. These facts, *first*, that for more than ten years Mr. Edison had considered the possibility of making duplicate records as distinguished from originals, and, *second*, that concurrently with the issue of the patent under consideration a patent was taken out by him describing such a method in connection with the special record which we are here considering, indicate more eloquently than words that the production of records suitable for receiving successive impressions was not the essential object of the patent.

IV. What that object was, is perfectly clear from the patent itself. That object primarily was, not to make a record capable of receiving successive impressions, although in some instances that might be desirable, but, first and foremost, to produce *a satisfactory commercial device.* The prior devices were neither satisfactory nor commercial, and, as we have shown, were quickly replaced by the new invention.

V. Mr. Carter's contention that "this patent was brought out at the very infancy of the art" also finds no basis in fact. So far as composite records are concerned, that art may be said to date from the Edison patent No. 200,521 of 1878. The modern cutting or engraving process dates from the Bell and Tainter patent No. 341,214 of 1886. From that time onward Bell, Tainter, Herrington and Edison himself were all striving towards the perfection of the

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art. Considering the large number of patents which were taken out by these inventors, it would appear that at the date of the patent under consideration the art had received a very considerable development and could no longer be regarded as being in its infancy. Some arts, of course, are developed more rapidly than others. Where an invention is intricate in character, requiring large capital and involving the employment of ponderous apparatus, as for instance, one relating to the manufacture of steel, its development may be slow and its period of infancy may extend over many years, and this is especially true when the development of the art is due to only a single worker in the field. On the other hand, with a relatively simple invention like the phonograph, and especially where a number of skilled inventors are independently working towards its development, the growth is much more rapid and the period of infancy may be counted in months. The true view of the matter that for a number of years prior to the present invention, all the inventors in the art without a single exception were plodding along the beaten track without achieving success, while when the present invention was made, every one turned to the new road, and then for the first time the long-sought practical phonograph was produced.

For these reasons, we do not see how any reliance can be placed in the special argument advanced by Mr. Carter. Being based on a misinterpretation of the invention of the patent in suit, as well as upon a misunderstanding of the true relation between that patent and the prior art, we do not see how Mr. Carter's *conclusion* can be given any weight. Every essential for sustaining the patent is presented, notwithstanding the chief defense under consideration. The invention is admittedly novel and useful. The claims are admittedly capable of a construction which will include the defendants' manufacture. The patented device was produced only after a number of inventors, including Mr. Edison himself, had made numerous experiments and had taken out many patents relating to composite records. When the new device was put on the market,

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it quickly supplanted all of the previous inventions, and for the first time resulted in complete commercial success.

Patent No. 414,761.

Concerning this patent, we have before called attention to the fact *(supra*, pp. 36–38) that its validity is admitted by Mr. Carter—

> " if understood as so limited to a wax or waxlike record cylinder cast in a mold and with a series of ribs or spiral projecting turns provided at intervals along the interior bore or surface of the cylinder."

and also to the fact that the novelty of the invention is admitted, as well as the fact that a rational construction of the claims includes defendant's manufacture (D. R., p. 126, x-Qs. 149, 150, 151). Mr. Carter, however, expresses the opinion that the first and third claims must be limited by implication to the provision of a spiral rib, because if rationally construed they include the construction disclosed by Defendant's Exhibit L. We have already considered this exhibit under the general discussion of the question of infringement *(supra*, p. 36*)*, and at this place, therefore, we shall content ourselves with a summary of our criticisms thereof:

I. In the first place, the exhibit relates to an electric generator, and therefore has no analogy or relation to phonographs. A prior device or patent or publication, in order to be available in anticipation of a patented invention, must, under the authorities, relate to an analogous art. No one working towards the development of a phonograph would be expected to look for assistance in the art of constructing electric generators.

II. In the next place, the provision of internal ribs, as described by the patent under consideration and as adopted by defendants, possesses a special utility in this particular field. Mr. Edison says:

> " At first the blank was reamed out, tapered, and the inner part was solid, but it was found

after a time that a continuous surface did not hold as well on the tapering mandrel, and that wax chips and dirt would get inside and tend to break the cylinder when it was forced on, and also make it run out of true, and therefore an inner rib was cast with the cylinder and this was tapered to fit the mandrel of the phonograph" (C. R., p. 84, fol. 336).

On cross-examination he said (C. R., p. 87):

"18 x-Q. Did your first phonograms made entirely of wax contain ribs?

"A. At first they didn't have any ribs, but they would not hold on well.

"19 x-Q. How thick were the materials that didn't have any ribs?

"A. My impression is they were about a quarter of an inch.

"20 x-Q. And the reason they didn't hold well without ribs was that the dust would accumulate between the two tapers, the taper of the bore and the taper of the spindle?

"A. Yes; for that reason and for the reason they didn't have the elasticity between the ribs.

"21 x-Q. What do you mean by 'elasticity between the ribs'?

"A. The wax has a certain degree of elasticity, and in forcing them on the mandrel this elasticity was used to a certain extent.

"22 x-Q. But the principal reason, however, was to allow space in which dirt and chips might accumulate that wouldn't throw them out of true; is that not so?

"A. That was one of the reasons, and another was to get the elasticity and also to permit ease of reaming in forming the cylinder, so it was cheaper."

All of these reasons, the production of a device in which the presence of dust or wax chips would not interfere with the operation of the record, provision of elasticity in the material to make it hold better, and ease and cheapness of reaming, are practically confined to this special art, and find no analogy whatever in other arts.

III. With the exhibit, the parts to be rotated—*i. e.*, the armature and commutator, are not frictionally en-

Raymond R. Wile
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gaged with the rotating part, but are positively locked thereto by means of keys or counterpins. With the exhibit neither the mandrel or shaft, nor the armature or commutator, is tapered, or any suggestion of such a feature made.

So far, therefore, as the defense of lack of invention in the patent under consideration is concerned, we submit that it should not receive serious consideration. The improvement is new and useful, and has been adopted by defendants. The claims clearly comprehend defendants' manufacture. The only alleged anticipation is found in an art which has no analogy whatever to the patent, and in which the special features of utility present in this art are not realized to any extent whatever. More than this, even if the alleged anticipating practice were analogous to or suggestive of the phonographic art, the prior disclosure is entirely insufficient, since the very essential of the patented invention is lacking, namely the making of a record with ribs so constructed and arranged as to *frictionally* engage the *tapered* mandrel.

Summary.

I.

The phonograph was invented in 1877, and covered by a number of patents at that time. Its improvement was undertaken by Bell and Tainter in 1881, and those inventors, after more than six years experimenting, produced the so-called graphophone. In the development of that machine a number of patents were taken out illustrating its evolution, and which have been heretofore referred to. During this time, also, Herrington was working towards the perfection of the phonograph, and obtained a number of patents, the application for the earliest of which was filed in September, 1886. As a result of all this work, over such an extended period of time, on the part of skilled and able inventors, an instrument was produced having the

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general construction illustrated in Tainter patent No. 380,535 of April 3d, 1888 (C. R., p. 109). This graphophone was provided with a cylindrical or tubular composite record held in position between end disks, one of which was spring-pressed.

II.

When the task of making the phonograph commercial was undertaken by Edison in 1887 the three inventions of the patents in suit were made, consisting, *first*, in making a tubular blank with a tapered bore so as to be received frictionally on a tapered mandrel; *second*, in dropping the idea of a composite record entirely and making it of the same waxlike material throughout so as to avoid any variations of the record surface, due to changes in temperature; and, *third*, in forming the record with ribs, flanges or projections on its bore, with the concomitant advantages heretofore referred to. When these inventions were made "the phonograph, in the hands of the public, worked successfully and was commercial" (C. R., p. 83, fol. 331). As soon as the commercial phonograph was introduced embodying the inventions of the patents in suit all the graphophones then in operation "were withdrawn from the market," and the "Graphophone Company then took a license under our patents and have since put out the phonograph in the same form as is now universal, employing the inventions in this litigation" (C. R., p. 83, fol. 332).

III.

Defendants manufacture and sell phonograph records which can be used only in connection with phonographs made under Edison's patents. Those records are formed with tapering tubular bores, they are constructed of the same material throughout, and are provided with internal flanges which frictionally engage the mandrel. Those records are sold in com-

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petition with records manufactured by complainants as well as by licensees under the patents in suit, and they have no other field of utility. Since defendants' records are provided with tapering bores, infringement of patent in suit No. 382,418 is not questioned, and as they are also provided with internal flanges, infringement of patent in suit No. 414,761 is not denied.

IV.

Infringement of patent in suit No. 382,462 is denied on the sole ground that defendants do not employ records made of a "wax or waxlike material." Defendants argue that a waxlike material must be one having the capacity of being readily cut or engraved by an ordinary phonographic recorder. They admit, however, that such a limitation is not necessary in view of the prior art, and that prior to the date of the patent under consideration no record had been suggested composed wholly of an amorphous material presenting a smooth recording surface of a nonfibrous nature. The proofs show, (1) that at the date of the patent under consideration, the inventors working in this art appreciated the desirability of producing records with smooth recording surfaces, and in the Bell and Tainter patent "waxlike" is used synonymously with "amorphous"; (2) that at the date of the patent under consideration, Edison had suggested the possibility of using different waxes, which were too hard to be cut or engraved by a recording device; and (3) that prior to the date of the patent under consideration, celluloid had been recognized as a satisfactory material for phonograph records, and had been suggested for use interchangeably with and in addition to various other waxlike or waxy substances. In view of these facts, we believe that celluloid should, unquestionably, be included in the general category of "waxlike materials."

Raymond R. Wile
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V.

The only defense which is seriously urged against patent in suit No. 382,418 is that of lack of invention. Defendants, however, admit that prior to Edison's invention no phonograph record had ever been produced having a tapered bore. They also admit that no art, analogous to phonographs or not, discloses a cylindrical piece of *work* having a tapered bore and carried frictionally on a tapered mandrel. The references in the so-called prior art are not only non-analogous to the phonographic art and hence not available as anticipations of the patented invention, but are manifestly lacking in pertinence, since no instance has been given of a cylindrical object with a tapered bore carried on a tapered mandrel.

VI.

The defense of lack of invention raised in connection with patent in suit No. 382,462 has not been sustained. We have shown that the entire argument under this head is based on a misapprehension of the facts. The invention under consideration was not produced at the "infancy of the art," but was made only after the art had been very fully developed, and after all the inventors had, for at least ten years, been traveling in the wrong direction. Every single patent without exception preceding the patent in suit under consideration disclosed a composite record, and those records have all been supplanted by the patented invention and are now nowhere to be found.

VII.

So far as patent in suit No. 414,761 is concerned, the defense of lack of invention is also abortive, because the only reference which has been produced in anticipation thereof relates to an entirely nonanalog-

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ous art, in which the special utility of the patented invention would not be realized, and which in any event is entirely foreign to the perfected arrangement in not showing a taper-bored cylinder, or one engaging a tapered mandrel, or one maintained in place solely by friction.

VIII.

Defendants do not deny that the patented inventions contributed materially to the perfection of the modern phonograph. They do not dispute the very considerable utility of those inventions, as a result of which many millions of the patented records have been sold. Their own appropriation of the patented inventions furnishes the best possible evidence of utility. They admit the novelty of the patented inventions. As to the first and third patents in suit, they do not deny infringement in the proofs, and as to the second of those patents they admit in the proofs that its claims are capable of a construction which will include their manufacture. As to the second of these patents on the question of infringement, and as to all the patents on the question of lack of invention, defendants present purely technical arguments, based on unsound premises and disclosing a complete lack of comprehension of the history surrounding the patented inventions. Technical arguments of this sort do not come, we submit, with good grace from persons who seek by the bold appropriation of patented inventions to interfere with rights which the public has, up to the present time, fully respected. The patents in suit covering devices which are admittedly new and useful, we see no reason why they should not be regarded as involving the element of *invention* and the patents therefor sustained. Of course we do not claim that the patented inventions evidence the same character of thought as is represented in the production of an intricate machine. Mr. Edison, in fact, refers to them as "a number of small inventions" (C. R., p. 83, fol. 331), but states that they were "enormously important in accomplishing the ob-

Raymond R. Wile
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ject" (C. R., p. 84, fol. 333). It is, of course, unnecessary under the authorities that a device, in order to be patentable, should partake of any definite degree of invention, and patentability is present when the inventive faculty has been called into play, however slight may be its character, provided, of course, the device is also new and useful.

In the *Barbed Wire Case*, 143 U. S., 275, the patented invention consisted in providing a two-strand fence wire with prongs formed of short pieces of wire coiled in place around one of the main strands. The prior art, as shown in the Kelly patent, consisted of a two-strand fence wire with sheet metal prongs strung on one of the strands. The essential difference between the prior art and the patented invention was that with the latter the prongs were formed of wire coiled in place, while with the former the prongs were composed of sheet metal pieces cut to shape. The Court (opinion by Justice BROWN) said:

> "It is true that the affixing of barbs to a fence wire does not apparently give a wide scope to the ingenuity of the inventor; but from the crude device of Hunt to the perfected wire of Glidden, each patent has marked a step in the progress in the art. The difference between the Kelly fence and the Glidden fence is not a radical one, but slight as it may seem to be, it was apparently this which made the barbed wire fence a practical and commercial success. * * * Under such circumstances courts have not been reluctant to sustain a patent to the man who has taken the final step which has turned a failure into a success. In the law of patents it is the last step that wins. It may be strange that, considering the important results obtained by Kelly in his patent, it did not occur to him to substitute a coiled wire in place of the diamond shape prong, but evidently it did not; and to the man to whom it did, ought not to be denied the quality of inventor. There are many instances in the reported decisions of this court where a monopoly has been sustained in favor of the last of a series of inventors, all of whom were groping to attain a certain result, which only the last one of the number seemed able to grasp."

Raymond R. Wile
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In *Loom Co. vs. Higgins*, 105 U. S., 580, the evidence showed that with the patented device the output of the best prior looms was increased twenty-five per cent. Notwithstanding this, the argument was made that the Webster loom was lacking in invention. In considering this defense, the Supreme Court (opinion by Mr. Justice BRADLEY), said:

> "But it is plain from the evidence and from the very fact that it was not sooner adopted and used that it did not, for years, occur in this light to even the most skillful persons. It may have been under their very eyes, they may almost be said to have stumbled over it; but they certainly failed to see it, to estimate its value, and to bring it into notice. * * * Now that it has succeeded, it may seem very plain to any one that he could have done it as well. This is often the case with inventions of the greatest merit. It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of known elements produce a new and beneficial result, never attained before, it is evidence of invention."

In *Consolidated Safety Valve Co. vs. Crosby Steam Gauge & Valve Co.*, 113 U. S,, 157, the Court, by Justice BLATCHFORD, said (p. 179):

> "Richardson's invention brought to success what prior inventors had essayed and partly accomplished. He used some things which had been used before, but he added just that which was necessary to make the whole a practically valuable and economical apparatus. The fact that the known valves were not used, and the speedy and extensive adoption of Richardson's valve, are facts in harmony with the evidence that his valve contains just what the prior valves lack, and go to support the conclusion at which we have arrived on the question of novelty."

In *Potts vs. Creager*, 155 U. S., 608, the Court said:

> "The apparent simplicity of a new device often leads an inexperienced person to think that it would have occurred to any one familiar with the subject; but the decisive answer is that, with dozens and perhaps hundreds of others laboring in

> the same field, it had never occurred to any one before. The practiced eye of an ordinary mechanic may be safely trusted to see what ought to be apparent to everyone."

In the several cases to which we have referred we believe that a careful consideration of the facts will show no greater *relative* utility in the particular arts with which the earlier patents had to deal than is the case with the Edison patents in suit in their bearing on the phonographic art ; and we think that such an examination will also disclose the fact that in the prior cases the patented inventions were in many instances more closely connected to the prior art, and in no instance more completely removed therefrom than is the case with the patents in suit.

Conclusion.

Wherefore, we submit that there should be a decree in each case for complainant.

New York, December 31, 1902.

RICHARD N. DYER,
Of Counsel for Complainants.

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